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Progress in the implementation of the Programme of Action for the Sustainable Development of Small Island Developing States

Report of the Secretary-General

Addendum

Climate change and sea level rise*

Contents

		Paragraphs	Page
I.	Introduction	1–2	3
II.	Problems	3–4	3
III.	Progress achieved	5–14	4
	A. Implementation of the United Nations Framework Convention on Climate Change	5–6	4
	B. Monitoring and collection of data and exchange of information	7–8	4
	C. Assessment of vulnerability and adaptation to climate change	9–10	4
	D. Improved scientific understanding of climate change and the impacts of sea level rise	11–13	5

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	E.	Funding from the Global Environment Facility	14	5
IV.	Constraints		15	6
V.	Priorities for future action		16–19	7
	A.	National level	16	7
	B.	Regional level	17	7
	C.	International level	18	8
	D.	Implementation of the IPCC framework	19	9

I. Introduction

1. In 1995, the Intergovernmental Panel on Climate Change (IPCC) concluded that global mean surface air temperature has increased by about 0.3–0.6 °C since the late nineteenth century. Small island developing States are especially vulnerable to climate change and concomitant sea level rise because their populations, agricultural land and infrastructure tend to be concentrated in the coastal zones. Their vulnerability has increased over time due to anthropogenic activities. Studies suggest that overexploitation of the natural resources of small island developing States has led to a loss in their resilience to cope with sea level rise.

2. There are no accurate estimates of the mitigation costs of protecting small island developing States against climate change per se. However, IPCC estimates that adaptations to climate change could total about 0.43 per cent of the gross domestic product of most developing countries. For the Caribbean small island developing States, for example, IPCC estimated that the costs of new construction alone for protection against sea level rise would amount to US$ 1.1 billion (1990).

II. Problems

Inundation of coastal settlements

3. Sea level rise will inundate many low-lying coastal areas. This is of serious concern to small island developing States given that most of their populations live in coastal areas, either because the islands are very small or because the steep areas of larger islands are not suitable for habitation. Both situations result in a high population density along the coastline, thereby increasing the vulnerability of the population to sea level rise. The inundation of coastal areas can result in: (a) loss of agricultural land, a common concern because agriculture is still the primary source of income in many small island developing States, and most agricultural land lies along the coastline, increasing its vulnerability to sea level rise; (b) loss of exclusive economic zone (EEZ), a common concern because sea level rise will also reduce the exclusive economic zone, thereby reducing the resource base. The inundation of coastal areas will result in salt water intrusion. Since many small island developing States rely on groundwater, this will have a negative impact on water-related development activities, as well as on the sustainability of the agricultural sector.

Tourism

4. Hospitable weather and excellent sun, sand and sea linkages enhance small island developing States as desirable tourist destinations. If this ambience is lost because of climate change and loss of beaches from sea level rise, the negative impact on the tourism industry will be significant. Many small island developing States will suffer massive losses of both revenue and employment opportunities.

III. Progress achieved

A. Implementation of the United Nations Framework Convention on Climate Change

5. Most island countries have ratified the United Nations Framework Convention on Climate Change and are acting to ensure compliance through a coordinated series of projects. Some countries, such as Fiji, Mauritius, the Marshall Islands and the Federated States of Micronesia are already undertaking studies of greenhouse gas sources and sinks. Comprehensive and coordinated support to all Pacific island Parties to the Convention is provided under the Global Environment Facility (GEF)-funded Pacific islands climate change assistance project, which is meant to assist countries in meeting their national reporting obligations under the Convention. United Nations agencies are also assisting small island developing States in preparing their national communications for the Convention. Enabling activities for climate change have been carried out for Maldives, Niue and Mauritius. Proposals for similar enabling activities in Cuba, Haiti, Comoros and the Dominican Republic are also in the preparation stage.

6. Article 12 of the Kyoto Protocol to the Convention adopted in 1997 contains the clean development mechanism. This mechanism has the goal of (a) assisting Parties not listed under annex I (which include small island developing States) to contribute to the ultimate objectives of the Convention and to help achieve sustainable development; and (b) assisting Parties listed under annex I to achieve compliance with their quantified emission limitation and reduction commitments.

B. Monitoring and collection of data and exchange of information

7. Many small island developing States have some operational climate data-collection systems. The South Pacific Regional Environment Programme (SPREP), for example, is developing a programme to enable countries to collect, analyse and interpret meteorological data. As part of a South Pacific sea level rise monitoring project funded by Australia, gauges for monitoring sea level have been established in 11 countries in the South Pacific region. In the Caribbean region, the tide gauge monitoring network for the Global Oceanic Observation System (GOOS) has been strengthened. Maldives has also indicated an interest in participating in GOOS.

8. Under the coordination of SPREP, Pacific Island countries are participating in and contributing to international programmes, including (a) the Pacific El Niño and Southern Oscillation Centre; (b) an atmospheric radiation measurement project; (c) a South Pacific sea level rise monitoring project. A network of climate change focal points has been established in the Pacific region, and SPREP continues to coordinate climate change activities.

C. Assessment of vulnerability and adaptation to climate change

9. Studies for assessing the locations where sea level rise impacts are likely to be greatest, based on geographical, physical, social and economic indicators, have been carried out in 12 Pacific Island countries and some countries in the Caribbean. In addition, studies of

vulnerability to erosion have been conducted in Fiji and Kiribati. In-country seminars on coastal monitoring have been conducted in Tuvalu, Kiribati and Samoa.

10. The Caribbean project entitled "Caribbean: planning for adaptation to climate change" is a direct outcome of the Programme of Action for the Sustainable Development of Small Island Developing States. This regional project is meant to assist countries in coping with the adverse effects of climate change. The project deals specifically with the potential impacts of sea level rise on coastal and marine areas through vulnerability assessments. It also contains provisions for capacity-building linked to adaptation planning.

D. Improved scientific understanding of climate change and the impacts of sea level rise

11. Our understanding of climate change and sea level rise is increasing aided by climate models, which are increasingly being used as tools both to understand climate change and to make future projections. Within the limits of current scientific knowledge and the capacity of current computers, the models attempt to simulate the complex physics and dynamics of the earth-atmosphere-ocean-land-ice systems. Many of these models now include sea level as one of the relevant variables.

12. IPCC has analysed adaptation and mitigation strategies. It has also provided an extensive analysis of the economic and social ramifications of climate change. Notwithstanding major uncertainties, there appears to be sufficient information to provide a credible basis for action now. A number of monitoring programmes, such as GOOS, the Global Climate Observation System (GCOS) and the Global Sea-Level Observation System (GLOSS) are directed towards identifying signs of climate change, and to addressing the gaps in our understanding of the physics of atmosphere-land-ocean-ice interactions.

13. The World Climate Research Programme is carrying out major research projects on what changes are occurring in the ocean and how they are occurring. The United Nations Environment Programme (UNEP) has established a working group on the El Niño Southern Oscillation (ENSO) to examine the potential of using ENSO forecasts in early warning systems for famine, and how that information could be utilized to prepare for the adverse impacts of climate variability. It is also examining the implications of climate change on the frequency, intensity and impacts of ENSO-related events on socio-economic systems. A joint working group on climate change detection and attribution has been established by the World Climate Research Programme and the World Meteorological Organization Commission for Climatology. Its task is to provide a firm scientific base for making assessments on the current rate of global climate change and its manifestations at the regional level.

E. Funding from the Global Environment Facility

14. The Global Environment Facility (GEF) has provided funding to small island developing States for various enabling activities, including one regional project entitled "Regional planning for adaptation to climate change", which is meant to assist countries in preparing to cope with the adverse effects of climate change, particularly sea level rise. GEF has also granted funds for enabling activities in small island developing States, totalling US$ 12.42 million as of December 1997. It has also provided funding to small island developing States in the area of environmentally sound energy development, at a cost of

US$ 7.1 million. That sum has subsequently leveraged more than US$ 60 million for the same purpose. Some small island developing States also benefit through participation in a number of global projects on enabling activities.

Case study: Niue

Niue is a small island in the South Pacific, about 65 kilometres in circumference, with a population of 2,000. The traditional belief in Niue was that climate was the creation of God, not to be disturbed, and that any changes that occurred were His way of doing things. However, there has been a noticeable change in perspective following a national climate change awareness workshop in 1998, attended by 70 local participants. The participants were divided into six groups (see below) and were given specific tasks in the preparation of the country's first communication on this topic. The groups comprised local experts, and were provided with resources to hire external consultants should the need arise.

The greenhouse inventory group has estimated the carbon dioxide emissions from fossil burning fuels to be 4,931.003605 gigagrams. The education training and awareness group has facilitated public awareness through village meetings and school programmes. The capacity-building group is developing a national action plan for human resources development, while the mitigation and options group is examining approaches suitable to the country's situation. The environment group has found that the soil is vulnerable to prolonged dry periods, while the vulnerability impact and assessment group is working to address its responsibilities. The Government of Niue has also developed a national environment strategic management plan, highlighting the vulnerability of the country to climate change.[1]

IV. Constraints

15. During the implementation of activities in the area of climate change and sea level rise, implementing agencies faced various constraints. Though these differ from region to region, the common ones are financial information and manpower constraints: the establishment and/or operation of national and regional institutions in small island developing States are highly dependent on external funding. This financial dependence limits the ability of regional institutions to guarantee this function over the longer term. Anticipated new finances are also not forthcoming in many cases. At the national level, the sources of information on small island developing States sea level rise are dispersed. Furthermore, different institutions are using different methods to assess sea level rise. In most small island developing States, there is no centralized information on what organization has what information, which makes it difficult to access the available information. There is often a lack of both personnel and institutional capacity to monitor climate change at either the national or regional levels.

V. Priorities for future action

A. National level

16. Most small island developing States national development plans do not consider the possibility of sea level rise. In view of that shortcoming, it is imperative for small island developing States to re-examine their national environmental, conservation and development plans and to make adjustments, as necessary, to consider that possibility. Development priorities for national actions include the following:

(a) Policies, plans and regulatory frameworks for land use must be re-examined to consider the possible impacts of sea level rise;

(b) Many small island developing States must also review their criteria for land use planning, as well as their long-term investment decisions, in order to develop new regulations which take into account climate change and sea level rise in conjunction. In order to enhance possibilities for agreed action, such criteria should be developed by professionals in consultation with the communities affected;

(c) Vulnerable areas must be identified based on detailed survey data and plausible global assumptions about sea level rise;

(d) National coastal zone management policy must be developed to take the possibility of sea level rise into account. Such policy is likely to point to new options for dealing with future threats;

(e) Areas that are vulnerable to sea level rise must be accurately mapped and used in physical planning exercises;

(f) Alternative freshwater sources to groundwater (e.g., rainwater harvesting, recycling and reuse of water) must also be developed.

B. Regional level

17. Priorities for regional action include the following:

(a) Information on climate change and sea level rise must be created based on the surveys, and regional information management programmes must be established. Such programmes should consider such issues as data collection and analysis, dissemination of information for decision makers at all levels, and utilization of new information technologies, as appropriate. They should include inputs from multidisciplinary teams at the national and regional levels;

(b) A regional information centre to coordinate existing databases should be established;

(c) Monitoring networks for weather, climate and sea level rise must be improved. Further sharing of relevant data should be made a priority;

(d) Additional research on climate is essential to increase understanding of climate variation and climate change and predictive capacity of their impacts on small island developing States;

(e) Studies on how vulnerable sectors are coping with current climate variability, natural disasters (e.g., cyclones), as well as studies of past and current actions to cope with their adverse impacts, are needed;

(f) Region-wide country-level research activities to increase the robustness of infrastructural design, increase the flexibility of vulnerable managed systems, enhance the adaptability of vulnerable natural systems and reverse the trends of factors that increase vulnerability should be developed and implemented;

(g) The scientific and technical capacity of small island developing States to develop and implement effective strategies and policies to minimize or mitigate the impacts of climate change and sea level rise must be developed and/or strengthened.

C. International level

18. Priorities at the international level include:

(a) Improvement of knowledge and understanding of climate change and sea level rise. Needed actions include:

(i) Facilitating research on the regional and temporal responses to sea level rise which considers changes in the frequency, intensity and location of higher-frequency and smaller-scale phenomena;

(ii) Facilitating establishment of an observation system for generating data sets to improve model predictions of climate change and for predicting direct future impacts on small island developing States. Such a system could include high-accuracy altimeters to measure spatial variations and monitor temporal variability and trends in sea level rise; sufficient open-ocean gauges (about 30) to allow researchers to eliminate trends in the altimeter, a globally distributed set of gauges for sampling at the margin of the areas monitored by the altimeter (including coastal regions and high latitudes), geodetic positioning to improve the reference levels of *in situ* gauges and improvements in the World Weather Watch Network to address small island developing States meteorological data gaps;

(b) Adaptation to climate change. Needed actions include:

(i) Assisting small island developing States in planning for adaptations to climate change, including support for regional organizations to train staff in such skills as mapping areas vulnerable to sea level rise;

(ii) Assisting small island developing States in carrying out specific in-country research in the four categories of anticipatory adaptation presented in the report of the GEF Science and Technology Panel entitled "Planning for adaptation to climate change", namely, increasing the robustness of infrastructural design and long-term investments; increasing the flexibility of vulnerable managed systems; enhancing the adaptability of vulnerable natural systems; and revising trends that increase vulnerability;

(c) Providing increased financial and technical assistance to small island developing States for building human resource and institutional capacity at the national and regional levels;

(d) Supplementing the resources of the relevant regional small island developing States institutions responsible for implementing projects on adaptation to climate change and sea level rise.

D. Implementation of the IPCC framework

19. Actions are needed in the following areas:

(a) Provision of technical assistance and technology, assisting small island developing States to prepare reports on their greenhouse gas emissions to meet their national reporting obligations, and a popularized version of the Kyoto Protocol, highlighting the clean development mechanism;

(b) Assisting in the transfer of appropriate technology to reduce greenhouse gas emissions;

(c) Resource mobilization: assisting small island developing States in obtaining funds from GEF and other donors to implement the Convention and the Kyoto Protocol, in particular to implement necessary measures to adapt to climate change;

(d) Monitoring and assessment: improving the monitoring network for weather, climate and sea level rise, promoting exchange of relevant data, strengthening the ability of small island developing States to participate in the global monitoring systems (e.g., GOOS, GCOS) and strengthening the monitoring and assessment capacity of small island developing States.

Notes

[1] See T. D. Coe, "Small is dutiful", *Our Planet*, vol. 9 No. 6 (1998).